

# Clinical manifestation, diagnosis, treatment and prevention of Coronavirus disease-2019 (COVID-19)

## Abstract

COVID-19 is a recently emerged infectious disease that has gripped the entire world resulting into high morbidity as well as mortality. SARS-CoV-2, a novel coronavirus, is one of the causes of respiratory infections that can transmit to other individuals through the respiratory particles and cause symptoms like fever, dry cough, and shortness of breath, anorexia, lethargy, and sore throat in infected patients. COVID-19 is difficult to distinguish during the early stages since it has a variety of clinical signs that are often comparable to other respiratory disorder. Presently, molecular tools are employed to confirm the infection due to COVID-19. Antibiotics should not be used to prevent or treat COVID-19; however treatments, such as colchicines, monoclonal antibodies, and anticoagulants are currently being studied. Home isolation of suspected cases and those with mild illnesses, as well as those with mild infection and contact and droplet precautions, are all part of the prevention strategy.

**Keywords:** covid-19, diagnosis, prevention, sars-cov-2, treatment

Volume 6 Issue 5 - 2021

**Mahendra Pal,<sup>1</sup> Kirubel Paulos Gutama<sup>2</sup>**

<sup>1</sup>Narayan Consultancy on Veterinary Public Health and Microbiology, India

<sup>2</sup>Adaba Woreda Livestock and Fishery Resource Development Office, Ethiopia

**Correspondence:** Prof. Dr. Mahendra Pal, Founder Director of Narayan Consultancy on Veterinary Public Health and Microbiology, Aangan, Jagnath Ganesh Dairy Road, Anand-388001, Gujarat, India, Tel 9226085328, ORCID 0000-0002-5602-1631, Email palmahendra2@gmail.com

**Received:** September 06, 2021 | **Published:** September 24, 2021

## Introduction

Coronavirus disease 2019 (COVID-19) is a life threatening emerging disease that is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).<sup>1</sup> The first cases were discovered in late December 2019 in Wuhan, China. It swiftly spread to almost the entire world from there. On March 11, 2020, the World Health Organization (WHO) declared it to be a pandemic.<sup>2</sup> 217,257,194 laboratory-confirmed COVID-19 cases and 4,513,251 COVID-19-related deaths have been reported worldwide as of the writing of this review article, demonstrating the pandemic's global impact.<sup>3</sup>

Coronaviruses are mostly spread from person to person through respiratory droplets, which are inhaled or deposited on mucosal surfaces, such as aerosols produced when coughing and speaking.<sup>4</sup> Other transmission pathways, such as faecal-oral, sexual, blood, and vertical transmission, are still remained unknown.<sup>5</sup> The incubation period for COVID-19 (the time between exposure to the virus and the beginning of symptoms) is five to six days on average, with a range of two to fourteen days.<sup>6</sup> COVID-19 severity is linked to advanced age, male sex, and pre-existing medical problems.<sup>7</sup>

Early diagnosis is crucial for disease containment and transmission reduction, since it allows patients to be isolated quickly and get critical treatment. The most extensively used SARS-CoV-2 diagnostic technique is real-time reverse transcriptase polymerase chain reaction (rRT-PCR).<sup>8,9</sup> Because there are no approved treatments for this infection at this time, prevention is essential.<sup>10</sup> This mini review is an attempt to delineate clinical presentation, diagnosis, treatment, and prevention of COVID-19.

## Clinical manifestations

COVID-19 symptoms might appear anywhere from 2 to 14 days following exposure to the virus.<sup>11,12</sup> COVID-19 patients might present with a variety of symptoms.<sup>13</sup> However, the full clinical picture is still

remained unknown.<sup>14</sup> The severity of the infection may vary from asymptomatic patients to severe cases of pneumonia that can lead to death.<sup>15,16</sup> Patients with mild symptoms were reported to recover in one week, but those with severe symptoms were said to develop progressive respiratory failure as a result of the virus's alveolar destruction, which could lead to death. Patients with pre-existing conditions (tumor surgery, cirrhosis, hypertension, coronary heart disease, diabetes, and Parkinson's disease) constituted the majority of those who died.<sup>17</sup> Around 80% of COVID-19 patients recover without needing hospital treatment, around 20% became seriously ill, and about 5% required intensive care.<sup>18</sup>

Fever, cough, myalgia or tiredness, pneumonia, and complicated dyspnea are the most typically reported symptoms of COVID-19, while headache, diarrhea, hemoptysis, runny nose, and phlegm-producing cough are less commonly reported symptoms.<sup>13,19</sup> The most prevalent symptom is fever, and cough is the second most common presentation, with coughing being directly linked to virus transmission via the respiratory droplets.<sup>12,20</sup> Sneezing, nasal congestion, and sore throat are some of the other symptoms associated with the upper respiratory tract.<sup>12</sup> Among the most common clinical manifestations are neurological symptoms.<sup>21</sup> COVID-19 has been linked to a variety of dermatological symptoms, including generic expressions like erythematous rash and widespread urticaria, as well as more specific manifestations like chickenpox rash.<sup>22,23</sup>

## Diagnosis

COVID-19 is difficult to distinguish during the early stages since it has a variety of clinical signs that are similar to those of other respiratory disorders.<sup>20</sup> COVID-19 tests are available to test for both current and previous infections. Antigen testing and nucleic acid amplification tests (NAATs) are two types of viral tests that can be used to diagnose current infection. A serology test, often known as an antibody test, can be used to diagnose a past infection. Antibody testing should not be utilized to diagnose current infection.<sup>11</sup> Imaging tests

are crucial in the management of the patients who have COVID-19, whether it is suspected or diagnosed. The initial imaging test is the chest X-ray. In cases of clinical, analytical, and radiological conflict, or when microbiological diagnosis is not achievable, CT is reserved for detecting probable sequelae and providing alternative diagnoses.<sup>2</sup>

Cases of COVID-19 are routinely confirmed by NAAT using real-time reverse transcription polymerase chain reaction (rRT-PCR) to detect unique sequences of virus RNA.<sup>24</sup> Loop-mediated isothermal amplification, multiplex isothermal amplification followed by microarray detection, and clustered regularly interspaced short palindromic repeats (CRISPR) based assays are among the molecular approaches being developed and evaluated around the world.<sup>25</sup> In addition to providing confirmation of the presence of the virus, virus whole genome sequencing is important to monitor viral genome mutations and can also inform molecular epidemiology studies.<sup>17</sup>

SARS-CoV-2 antigens or antibodies have been detected quickly using immunoassays.<sup>26</sup> Rapid antigen tests (also known as rapid diagnostic tests - RDTs) use a swab to collect samples from the nose and/or throat to identify viral proteins (known as antigens).<sup>27</sup> RDT are less expensive, provide results much faster, and do not require the same level of technical expertise or specialized facilities, making them appealing for large-scale adoption.<sup>28</sup> For the diagnosis of COVID-19 in individuals with symptoms, high-risk groups, healthcare personnel or essential employees, and contacts in settings where NAAT is not available, rapid antigen testing is recommended.<sup>29</sup> Monoclonal antibodies targeted particularly against SARS-CoV-2 are being developed, as are several fast antigen assays.<sup>30</sup>

The host response to infection is measured by a serological approach of diagnosis, which is an indirect marker of infection that is best used retrospectively.<sup>25</sup> The majority of immunological tests used to diagnose COVID-19 are based on the indirect ELISA approach, which is used to identify IgM and IgG antibodies.<sup>31,32</sup> Serological tests are unable to confirm the subject's infectious condition. Indeed, in the event of an ELISA-positive result, molecular confirmatory tests on nasopharyngeal swabs are required.<sup>33</sup> ELISA-based serological assays, on the other hand, are far more reliable than fast antigen or antibody tests.<sup>34</sup> Immunological tests, both commercial and noncommercial, are currently being developed.<sup>35,36</sup> It is not recommended to isolate viruses as a standard diagnostic practice.<sup>17</sup>

## Treatment

Antibiotics should not be used for COVID-19 prevention or therapy because they do not function against viruses.<sup>17</sup> Corticosteroids have previously been strongly suggested in patients with severe and critical COVID-19 because they have been found to prevent and reduce inflammation in tissues and in the circulation via non-genomic and genomic effects.<sup>37</sup> Patients who meet these severity criteria should now be treated with corticosteroids as well as IL-6 receptor blockers.<sup>38</sup> In hospitalized patients, hydroxychloroquine and lopinavir/ritonavir were recommended.<sup>39</sup> However, these medications do not appear to have any clinical benefit, and it is not suggested that they be used to treat COVID-19.<sup>40,41</sup> The evidence for using ivermectin to treat COVID-19 patients is still inconclusive. WHO recommends that the medicine be used only in clinical trials until more data is available. Colchicines, monoclonal antibodies, and anticoagulants are among the other COVID-19 treatments now being considered.<sup>37</sup>

## Prevention

A person can protect themselves and prevent the spread of COVID-19 by washing hands often with soap and water for at least

20 seconds at a time, when soap and water are not accessible, a hand sanitizer with high alcohol content should be used often. Avoid touching your eyes, nose, or mouth with your hands. Maintain a two-meter distance between you and others. Coughs and sneezes should be wiped away with a tissue or covered with the inner elbow. Surfaces, such as tabletops, counters, doorknobs, and handles should be cleaned and disinfected on a regular basis. Personal goods, such as cups and towels, should not be shared. Vaccinate as soon as the vaccine is available.<sup>17,42</sup>

Face covers can help prevent the virus from spreading through the air via droplets. Persons who have not been fully vaccinated, including children above the age of two, those who have been fully vaccinated but have a weaker immune system, and people who have not been fully vaccinated should wear a mask inside in public if they are in a region with significant and high transmission of the Delta variant to maximize protection and avoid possible dissemination to others.<sup>11</sup> They must seek medical assistance immediately if they exhibit any sign or symptom, particularly fever, respiratory signs, such as coughing, shortness of breath, or diarrhea.<sup>43</sup> People who have had intimate encounters with SARS-CoV-2 infected patients or have been exposed to questionable environmental publicity should be advised to undergo a 14-day health observation period, which begins on the last day of contact with the infected patients or suspicious environmental publicity.<sup>44</sup> Patients with minor symptoms and a suspected infection may recall being isolated at home and receiving domestic care.<sup>43</sup>

## Conclusion

The virus SARS-CoV-2 causes COVID-19, a highly contagious respiratory disease. Many people only have minor symptoms, but others acquire severe and occasionally fatal illnesses. Even if a person with COVID-19 shows no symptoms, the virus might still spread to others. For the diagnosis of COVID-19 infection, nucleic acid amplification procedures are the gold standard. COVID-19 has no cure at the moment, although therapies can help ease symptoms and promote breathing. Vaccines are becoming more widely available. Meanwhile, maintain physical distance, wash your hands frequently, avoid touching your face, and cover your face in public.

## Acknowledgments

None.

## Conflicts of interest

None.

## Funding

None.

## References

1. Pal M, Kerors G, Kandi R. A knowledge update on SARS–Coronavirus–2 (SARS–CoV–2)/COVID–19 and its global public health implications. *American Journal of Clinical Medicine Research*. 2020;8:48–56.
2. Chamorro ME, Tascón DA, Sanz IL, et al. Diagnóstico radiológico del paciente con COVID–19. *Radiología*. 2021;63(1):56–73.
3. Center for Systems Science and Engineering (CSSE) Johns Hopkins University (JHU). 2021.
4. European Medicines Agency (EMA). COVID–19 vaccines.
5. McIntosh K. Coronavirus disease 2019 (COVID–19): Clinical features. In: Hirsch MS, Bloom A, ed. UpToDate. Waltham, Mass. 2021.

6. Backer JA, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travelers from Wuhan, China, 20–28 January 2020. *Eurosurveillance*. 2020;25(5):2000062.
7. Figliozzi S, Masci PG, Ahmadi N, et al. Predictors of adverse prognosis in COVID-19: A Systematic Review and Meta-Analysis. *European Journal of Clinical Investigation*. 2020;50(10):e13362.
8. Pan Y, Zhang D, Yang P, et al. Viral load of SARS-CoV-2 in clinical samples. *Lancet Infectious Disease*. 2020;20(4):411–412.
9. Pal M, Bulcha MR, Bune WM. Challenges in the diagnosis of SARS-CoV-2 (COVID-19) infection. *MOJ Biology and Medicine*. 2021;6(3):127–128.
10. Singhal T. A review of coronavirus disease-2019 (COVID-19). *Indian Journal of Pediatrics*. 2020;87(4):281–286.
11. Riou J, Althaus CL. Pattern of early human-to-human transmission of Wuhan 2019. Novel coronavirus (2019-nCoV). *Eurosurveillance*. 2020;25(4): 2000058.
12. Center for disease control and prevention (CDC). Use Masks to Slow the Spread of COVID-19. 2021.
13. da Rosa Mesquita R, Francelino Silva Junior LC, et al. Clinical manifestations of COVID-19 in the general population: systematic review. *Wien Klin Wochenschr*. 2021;133(7–8):377–382.
14. Center for Disease Control and Prevention (CDC). Coronavirus disease 2019 (COVID-19). 2020.
15. Tu H, Tu S, Gao S, et al. The epidemiological and clinical features of COVID-19 and lessons from this global infectious public health event. *Journal of Infection*. 2020;81(9):1–9.
16. Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 2020;579:1–4.
17. Li T, Wei C, Li W, et al. Beijing Union Medical College Hospital on “pneumonia of novel coronavirus infection” diagnosis and treatment proposal. *Medical Journal of Beijing Union Medical College Hospital*. 2020;2:123–128.
18. World Health Organization (WHO). COVID-19 Strategy update. 2020.
19. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497–506.
20. Mungroo MR, Khan NA, Siddiqui R. Novel Coronavirus: current understanding of clinical features, diagnosis, pathogenesis, and treatment options. *Pathogens*. 2020;9(4):297.
21. Brann DH, Tsukahara T, Weinreb C, et al. Non-neural expression of SARS-CoV-2 entry genes in the olfactory epithelium suggests mechanisms underlying anosmia in COVID-19 patients. *Science Advances*. 2020;6(31):eabc5801.
22. Recalcati S. Cutaneous manifestations in COVID-19: a first perspective. *Journal of European Academy of Dermatology and Venereology*. 2020;34(5): e212–e213.
23. Marzano AV, Genovese G, Fabbrocini G, et al. Varicella-like exanthem as a specific COVID-19-associated skin manifestation: multicenter case series of 22 patients. *Journal of American Academy of Dermatology*. 2020;83(1):58–66.
24. Holshue ML, DeBolt C, Lindquist S, et al. First case of 2019 novel coronavirus in the United States. *New England Journal of Medicine*. 2020;382:929–936.
25. Ai JW, Zhang Y, Zhang HC, et al. Era of molecular diagnosis for pathogen identification of unexplained pneumonia, lessons to be learned. *Emerging Microbes Infections*. 2020;9(1):597–600.
26. Tang Y-W, Schmitz JE, Persing DH, et al. Laboratory diagnosis of COVID-19: current issues and challenges. *Journal of Clinical Microbiology*. 2020;58(6):12–20.
27. Diao B, Wen K, Zhang J, et al. Accuracy of a nucleocapsid protein antigen rapid test in the diagnosis of SARS-CoV-2 infection. *Clinical Microbiology Infectious*. 2021;27(2):e1–289.e4.
28. Boehme C, Hannay E, Sampath R. SARS-CoV-2 testing for public health use: core principles and considerations for defined use settings. *Lancet Global Health*. 2021;9(3):e247–e9.
29. Mina MJ, Peto TE, García-Finana M, et al. Clarifying the evidence on SARS-CoV-2 antigen rapid tests in public health responses to COVID-19. *Lancet*. 2021;397(10283):1425–1427.
30. Diao B, Wen K, Chen J, et al. Diagnosis of acute respiratory syndrome coronavirus 2 infection by detection of nucleocapsid protein. *medRxiv*. 2020;03:20032524.
31. Alhaji M, Farhana A. Enzyme Linked Immunosorbent Assay. Stat Pearls Publishing; Treasure Island, FL. 2020.
32. Tré-Hardy M, Wilmet A, Beukinga I, et al. Analytical and clinical validation of an ELISA for specific SARS-CoV-2 IgG, IgA, and IgM antibodies. *Journal of Medical Virology*. 2021;93(2):803–811.
33. Avsar T, Calis S, Yilmaz B, et al. Genome-wide identification of Chiari malformation type I associated candidate genes and chromosomal variations. *Turkish Journal of Biology*. 2020;44(6):449–456.
34. La Marca A, Capuzzo M, Paglia T, et al. Testing for SARS-CoV-2 (COVID-19): A systematic review and clinical guide to molecular and serological in-vitro diagnostic assays. *Reproductive Biomedicine Online*. 2020;41(3):483–499.
35. Shaoli B, Jianyun W, Zhou K. Analysis of the first family epidemic situation of new coronavirus pneumonia in Gansu Province. *Chinese Journal of Preventive medicine*. 2020;54(0):.
36. Shu-Yuan X, Yingjie W, Juan L. Evolving status of the 2019 novel coronavirus infections: proposal of conventional serologic assays for disease diagnostics and infection monitoring. *Journal of Medical Virology*. 2020;92(5):1–4.
37. Annane D. Corticosteroids for COVID-19. *Journal of Intensive Medicine*. 2021;1:14–25.
38. World Health Organization (WHO). Therapeutics and COVID-19: living guideline. (WHO-2019-nCoVtherapeutics-2021).
39. Lee Z, Rayner CR, Forrest JJ, et al. The rise and fall of hydroxychloroquine for the treatment and prevention of COVID-19. *American Journal of Tropical Medicine and Hygiene*. 2021;104(1):35–38.
40. Abd-El Salam S, Esmail ES, Khalaf M, et al. Hydroxychloroquine in the treatment of COVID-19: a multicenter randomized controlled study. *American Journal of Tropical Medicine and Hygiene*. 2020;103(4):1635–1639.
41. Gilmar Reis G, dos Santos E, Silva M, et al. Effect of Early Treatment With Hydroxychloroquine or Lopinavir and Ritonavir on Risk of Hospitalization Among Patients With COVID-19. *JAMA Network Open*. 2021;4(4):e216468.
42. Pal M, Bulcha MR, Banu MG, et al. SARS-CoV-2 (COVID-19) Pandemic remains a global public health threat. *Iberoamerican Journal of Medicine*. 2021;03:264–270.
43. Yuen KS, Ye ZW, Fung SY, et al. SARS-CoV-2 and COVID-19: The most important research questions. *Cell Bioscience*. 2020;10:40.
44. Sohrabi C, Alsafi Z, O'Neill N, et al. A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*. 2020;76:71–76.